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मानक

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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 2182 (1993): Symbols to be given on indication plates of machine tools - Recommendations [PGD 3: Machine Tools]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

मशीनी औजारों के सूचना पट्ट पर दिए जाने वाले
प्रतीक — सिफारिशें

(पहला पुनरीक्षण)

Indian Standard

SYMBOLS TO BE GIVEN ON INDICATION
PLATES OF MACHINE TOOLS —
RECOMMENDATIONS

(*First Revision*)

UDC 621'9 — 777 : 003'62

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Machine Tools Basics and Modular Units Sectional Committee had been approved by the Production Engineering Division Council.

In view of the fact that a large amount of national and international trade of machine tools exists, it has become necessary to unify the practices being followed in various countries in regard to the symbols that appear on indication plates and control panels of machine tools.

As far as possible the symbols recommended in this standard have been kept free of the words or letters in any language. It is hoped that the symbols, without any language being used with them, will be easily understood by machine tool operators.

It is also recommended that a judicious choice should be made from among the symbols given in this standard and only those symbols that are strictly necessary for the use of the machine tool should be indicated on the plates.

This standard was first issued in 1962 based on ISO Recommendation No : 481 : 1961 Symbols on Machine Tool Indicator Plates. Consequent after gaining experience, this revision has been taken up by including many other symbols and modifying the existing symbols so as these can be easily understood by the workmen. This standard is in alignment with BS 3641 (Part 1) : 1971 Symbols for machine tools: Part 1 General symbols and BS 3641 (Part 3) : 1973 Symbols for machine tools: Part 3 Additional general symbols; issued by British Standard Institution (BSI). While revising this standard considerable assistance has also been taken from ISO/R-369 issued by International Organization for Standardization (ISO).

For symbols on numerical control machine tools, refer IS 13635 : 1992 'Numerical control of machines-symbols'.

Indian Standard

SYMBOLS TO BE GIVEN ON INDICATION PLATES OF MACHINE TOOLS — RECOMMENDATIONS

(*First Revision*)

SECTION 0 GENERAL

0.1 Scope

This Indian Standard specifies basic designs for symbols intended for use on machine tools. Drawings in this standard relate to the form of symbols only and are not absolute dimensional representations.

The standard makes recommendations for proportions to be used in the design of symbols, independent of actual dimensions.

The standard provides for the grouping together of symbols selected from the same of different sections of the standard according to individual requirements.

Examples of groupings of symbols are given in Annex A for guidance purposes.

0.2 Sizes and Proportions

The symbols shown in this standard are accurately reproduced at basic size to a 0.8 mm grid. Where it is necessary to establish actual sizes then the symbols shown may be measured using a 0.8 mm transparent grid.

The absolute size of symbol is at the designer's discretion and indeed it may be desirable to have symbols in two different basic sizes. The proportions shown here will give a consistent appearance within each of the two size ranges selected.

The symbols have been designed using a basic reference grid of 5 units by 5 units where 1 unit = 0.8 mm. Each symbol is built up so that, with only a few exceptions, the symbol is circumscribed by rectangles which are modular with respect to the 5 unit grid, for example 5 × 10, 10 × 15, 10 × 40. In no case does the largest dimension of a symbol exceed 40 units.

The normal line thickness is 0.8 mm; where it has proved necessary to depart from the standard 0.8 mm line thickness this is immediately apparent.

In certain symbols, points and circles need to appear in contact with one another. However, if reproduced touching (no matter which method of reproduction is used) blurring of points and fusing of tangential circles would occur. To minimize these effects,

certain symbols show a small but deliberate clearance of 0.4 unit between some of the constituent elements of the symbol.

0.3 The Use of the Arrow

The arrow shape is a unique symbol in relation to all of the symbols in this standard and thus deserves special consideration on its own. It rarely appears as an isolated element, but is frequently used as the basis for a symbol, or qualifies another symbol to give it additional meaning.

There are four different applications using the arrow shape and it is desirable to use a different from in each of these instances:

Directional information,
Relative motion information,
Dimensional information,
Functional information.

0.3.1 Directional Information Arrows

The recommended form of a directional arrow is shown below, the important dimensions being the shape and proportion of the head and the associated width of the shaft. Overall length is not crucial and may be varied to accommodate situations where the arrow is graphically combined with other symbol parts. The curved form is for rotational information, the perspective view being superimposed on a shaft representation.



0.3.2 Relative Motion Information

Where it is not possible to define exactly the direction in space it is often useful to define relative motion between two machine parts; in this case the truncated arrow heads are used in pairs to define 'in' (or towards) and 'cut' (or away from).



0.3.3 Dimension Arrows

For symbols where dimensional concepts are required, an open headed arrow with no shaft is used.

**0.3.4 Functional Arrows**

Many symbols require a functional dynamic in the form of an arrow to improve their ease of interpretation. It is inappropriate to use the same arrow form as is used to define spatial directions, as the arrow shown on such symbols need not imply a specific direction. A heavier, bolder form of functional arrow is used in these cases.

**0.4 The Grouping of Symbols**

It is comparatively rare for a single symbol to be used in isolation. The grouping of symbols on displays is implicit in their application. These groupings generally fall into one of three types of association.

1. Hierarchical arrangements. One symbol serves as a general label or heading for a further

more detailed group of symbols, for example,

<i>Pump</i>	<i>Worktable</i>
start/stop	clockwise/anticlockwise

2. Pairing of symbols to build more complex symbol, for example, transverse feed; engage tracer.
3. Association of symbol with value or quantity, for example, feed X mm per revolution.

0.4.1 Classification

To facilitate and rationalize these combinations, the standard has been structured as follows:

Section 1	Modes
Section 2	Elements
Section 3	Values
Section 4	Actions
Section 5	Safety and status indications

These categories may need to be expanded in future to accommodate new symbols.

Section 6 Compound symbols

This shows some of the derived symbols while directly related to the basic set. These show some more common symbol combinations, but in theory combination is possible.

LIST OF SYMBOLS**SECTION 1 MODES**

The modes are categorized under four sub-headings :

1.1 Operating Modes: major machining functions.

1.2 Movement Modes: defining the nature of linear and rotational motions. The direction in space is derived from the primary definition of directions in the introductory section and the element symbol to

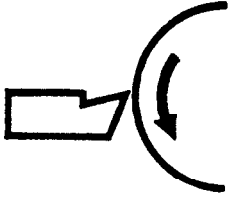
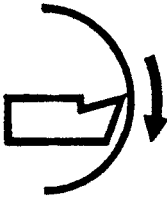
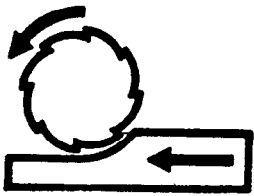
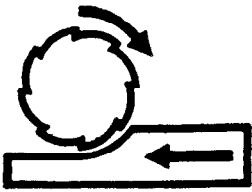
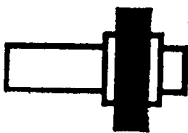
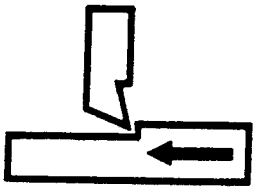
which the movement mode applies is combined with the movement move symbol.

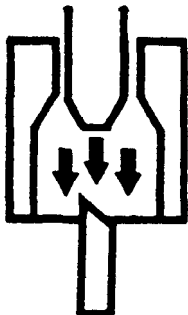
1.3 Control Modes: these define the manner in which the machine or element is controlled.

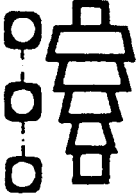
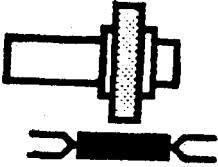
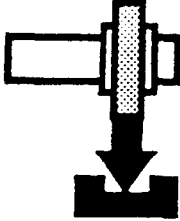
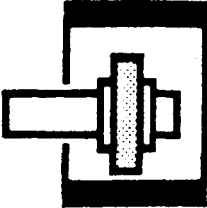
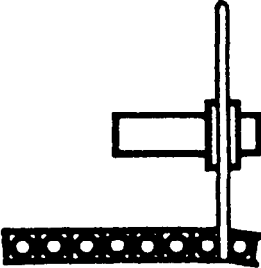
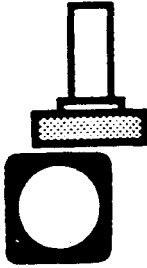
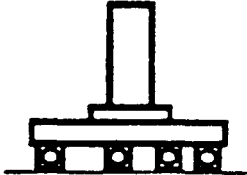
1.4 Auxilliary Modes: these define sub-functions which support major machining functions.

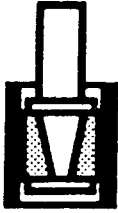
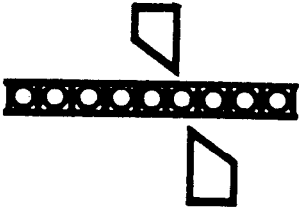
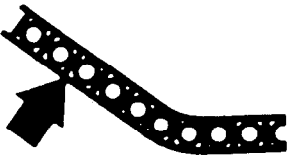
1.1 OPERATING MODES

No.	Designation	Symbol	Remarks
1.1.1	Feed		
1.1.2	Drilling		

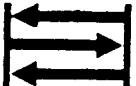
No.	Designation	Symbol	Remarks
1.1.3	Threading		
1.1.4	Turning		
1.1.5	Boring		
1.1.6	Conventional milling		
1.1.7	Climb milling		
1.1.8	Reaming		
1.1.9	Grinding		
1.1.10	Planing		For shaping, associate arrow with tool instead of workpiece

No.	Designation	Symbol	Remarks
1.1.11	Tapping		Threads may be inclined to show either R.H. or L.H.
1.1.12	Copying		
1.1.13	Parting off		
1.1.14	Vertical milling		
1.1.15	Blow moulding		
1.1.16	External broaching		
1.1.17	Internal broaching		

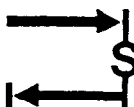
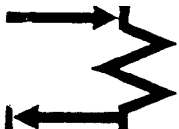
No.	Designation	Symbol	Remarks
1.1.18	Chain broaching		
1.1.19	External cylindrical grinding		
1.1.20	Plunge cut grinding		
1.1.21	Internal cylindrical grinding		
1.1.22	Cut-off grinding		
1.1.23	Face grinding		
1.1.24	Lapping		

No.	Designation	Symbol	Remarks
1.1.25	Honing		
1.1.26	Shearing/cutting		
1.1.27	Bending/folding		A particular type of tooling may be added to this basic symbol

1.2 MOVEMENT MODES

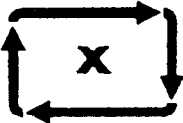
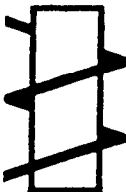
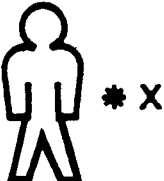
No.	Designation	Symbol	Remarks
1.2.1	Rectilinear motion		
1.2.2	Rectilinear motion in two directions		
1.2.3	Interrupted rectilinear motion (jog)		 In two directions*
1.2.4	Limited rectilinear motion		 In two directions*
1.2.5	Limited rectilinear motion and return		
1.2.6	Oscillating rectilinear motion		May be amplified to indicate overtravel by using extension of arrow for example : 

*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
1.2.7	Direction of continuous rotation		
1.2.8	Rotation in two directions		
1.2.9	Interrupted rotation		 In two directions*
1.2.10	Limited rotation		 In two directions*
1.2.11	Limited rotation and return		
1.2.12	Oscillating rotation		May be amplified* to indicate overtravel by using extension of arrow, for example : 
1.2.13	Dwell*		
1.2.14	Rapid traverse		
1.2.15	Feed per stroke*		

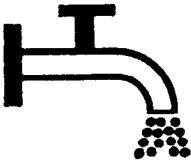
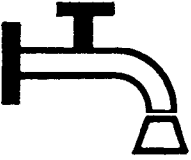
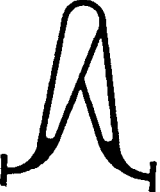
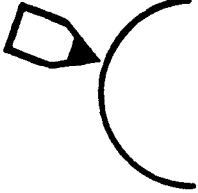
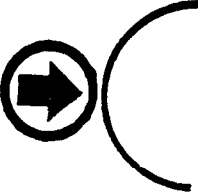
*Not included in ISO Recommendation.

1.3 CONTROL MODES

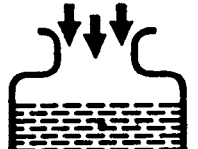
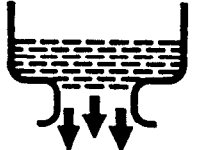
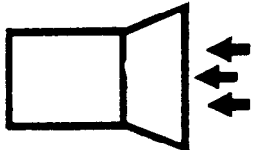
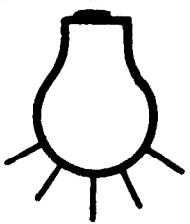
No.	Designation	Symbol	Remarks
1.3.1	Automatic*		Where a specified number of cycles x is required, it may be placed where shown
1.3.2	Manual		
1.3.3	One cycle*		
1.3.4	Magnetic*		
1.3.5	Multi-man operation		x = number of operators
1.3.6	Step-cycle		A discrete element of a complete cycle operative in its own right Normally associated with testing or checking

*Not included in ISO Recommendation.

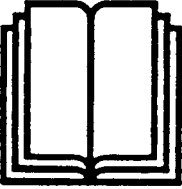
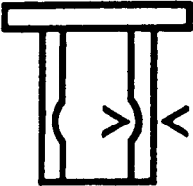
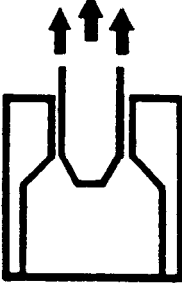
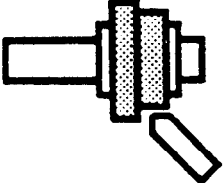
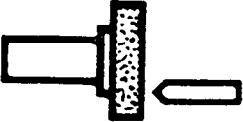
1.4 AUXILIARY MODES

No.	Designation	Symbol	Remarks
1.4.1	Coolant mist		
1.4.2	Coolant flood		
1.4.3	Material feed*		
1.4.4	Gauge size external*		
1.4.5	Gauge size internal*		
1.4.6	Truing dressing*		
1.4.7	Crush dressing*		
1.4.8	Lubricant-oil		

*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
1.4.9	Lubricant-grease*		
1.4.10	Hydraulic		
1.4.11	Filling		
1.4.12	Draining		
1.4.13	Blowing unit		
1.4.14	Suction unit		
1.4.15	Work area illumination		
1.4.16	Maintenance*		

*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
1.4.17	Refer to instruction book*		
1.4.18	Electrical instruction manual or diagram		
1.4.19	Wall thickness of a preform		
1.4.20	Ventilate blow die		
1.4.21	Form dressing		
1.4.22	Face dressing		
1.4.23	Static balance		

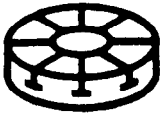
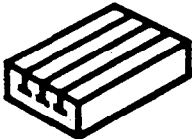
*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
1.4.24	Dynamic balance		
1.4.25	Out of balance		

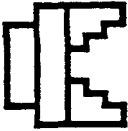
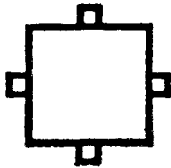
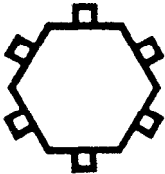
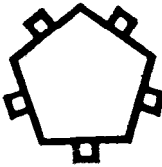
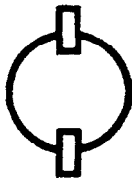
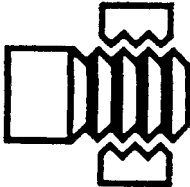
SECTION 2 ELEMENTS

The elements refer to identifiable machine parts associated with either the main machining operation or auxiliary operations associated with material handling or control systems.

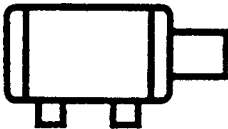
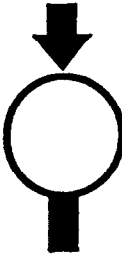
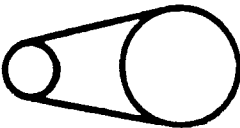
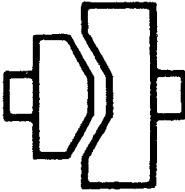
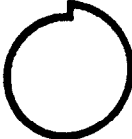
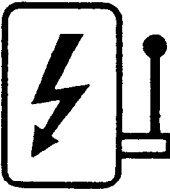
2.1 MECHANICAL ELEMENTS

No.	Designation	Symbol	Remarks
2.1.1	Cutter — general symbol*		
2.1.2	Workpiece — general symbol*		
2.1.3	Round work table or rotating element		
2.1.4	Rectangular work table or slide element		
2.1.5	Spindle		

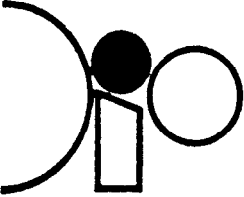
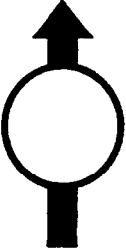
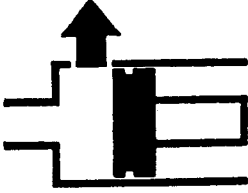
*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
2.1.6	Collet*		
2.1.7	Chuck		
2.1.8	Quill*		
2.1.9	Turret — square*		
2.1.10	Turret — hexagonal*		
2.1.11	Turret — pentagonal*		
2.1.12	Single facing slide*		
2.1.13	Double facing slide*		
2.1.14	Halfnut		Threads may be inclined to show L.H. or R.H. thread

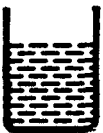
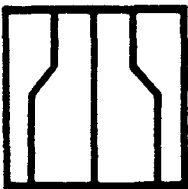
*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
2.1.15	Electric motor		
2.1.16	Hydraulic motor		
2.1.17	Belt drive*		
2.1.18	Gear drive*		
2.1.19	Clutch*		
2.1.20	Cam*		
2.1.21	Sheer pin		
2.1.22	Main switch		The arrow is red

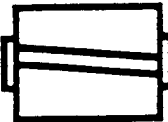
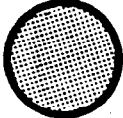
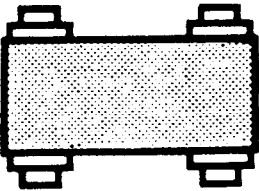
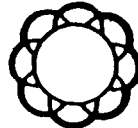
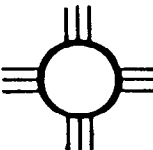
*Not included in ISO Recommendation.

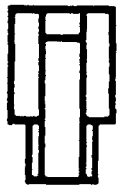
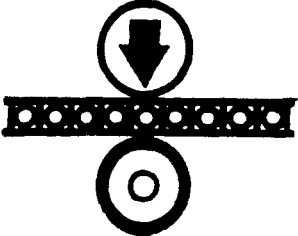
No.	Designation	Symbol	Remarks
2.1.23	Indicator lamp*		
2.1.24	Handwheel*		
2.1.25	Foot pedal*		
2.1.26	Regulating wheel or feed wheel*		
2.1.27	Lever*		
2.1.28	Pump (general symbol)		
2.1.29	Filter*		
2.1.30	Bleed point*		

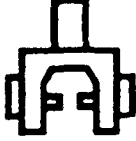
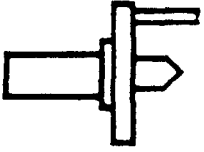
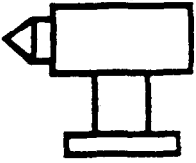
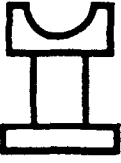
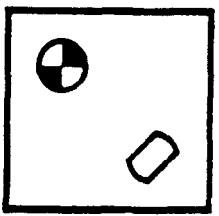
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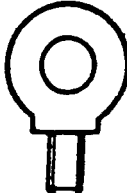
No.	Designation	Symbol	Remarks
2.1.31	Reservoir (tank)		
2.1.32	Indicating instrument*		
2.1.33	Blow moulding die		
2.1.34	Blow needle for blow moulding machine		
2.1.35	Blow mandrel for blow moulding machine		
2.1.36	Moulded form		
2.1.37	Injection cylinder (basic element)		
2.1.38	Injection cylinder with plunger		
2.1.39	Screw injection cylinders		

*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
2.1.40	Gripper finger type (mechanical handling)		
2.1.41	Cutter block		
	Alternative symbol		
2.1.42	Circular saw		
2.1.43	Roller		
2.1.44	Sanding discs		
2.1.45	Sanding drum		
2.1.46	Sanding band		
2.1.47	Polishing/wheel/disc/mop buffing		
2.1.48	Rotary brush		

No.	Designation	Symbol	Remarks
2.1.49	Conveyor		
2.1.50	Chain (transmission)		
2.1.51	Linear saw (for example blade or band saw)		
2.1.52	Chain saw		
2.1.53	Guard		This symbol shall not be altered beyond recognition. It may be qualified to depict particular types of guard. Guard shall be coloured red. Caution symbol yellow
2.1.54	Fly-wheel		
2.1.55	Slide (presses)		
	Slide (other uses)		
2.1.56	Pressure cushion (for presses)		
2.1.57	Strip feed-rollers		

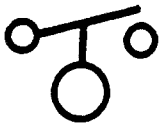
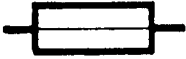
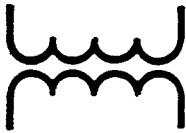
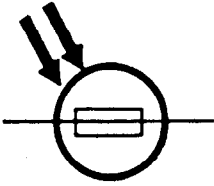
No.	Designation	Symbol	Remarks
2.1.58	Broach (basic symbol internal and external)		
2.1.59	Broach puller		
2.1.60	Broach retriever		
2.1.61	Abrasive wheel (basic symbol)		
2.1.62	Workhead		
2.1.63	Tail stock		
2.1.64	Work steady		
2.1.65	Fixture		

No.	Designation	Symbol	Remarks
2.1.66	Clamp		
2.1.67	Swarf		
2.1.68	Eyebolt		
2.1.69	Pulley Alternative		May be used to indicate speed changing devices, for example, on a grinding machine

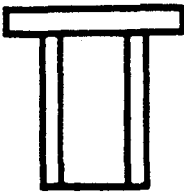
2.2 AUXILIARY ELEMENTS

No.	Designation	Symbol	Remarks
2.2.1*	Switch		
2.2.2*	Limit switch		
2.2.3*	Push button		

*Symbols 2.2.1 to 2.2.7 are general basic symbols and are not related to any specific contact arrangement or sequence. Such details will be given in appropriate diagrams or in handbooks. Any identity, for example, alpha-numeric associated with these symbols should be the same as those normally used in diagrams for text.

No.	Designation	Symbol	Remarks
2.2.4*	Pressure switch		Setting values may be added
2.2.5*	Thermostat		Temperature may be added, for example, x °C
2.2.6*	Float switch		
2.2.7	Selector switch		
2.2.8	Solenoid		
2.2.9	Fuse		
2.2.10	Transformer		
2.2.11	Photo-electric cell		
2.2.12	Heater		

*Symbols 2.2.1 to 2.2.7 are general basic symbols and are not related to any specific contact arrangement or sequence. Such details will be given in appropriate diagrams or in handbooks. Any identity, for example, alpha-numeric associated with these symbols should be the same as those normally used in diagrams for text.

No.	Designation	Symbol	Remarks
2.2.13	Preform (for example, in moulding)		
2.2.14	Continuous material		
2.2.15	Press tool		
2.2.16	Plug and socket		

SECTION 3 VALUES

Values define units to which numerical quantities can be ascribed. They may either be a single number or may refer the units quoted in an associated column of table.

3.1 QUANTITIES

No.	Designation	Symbol	Remarks
3.1.1	Revolutions*		
3.1.2	One revolution		
3.1.3	Time — seconds*		

*Not included in ISO Recommendation.

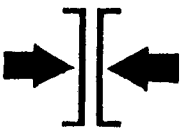
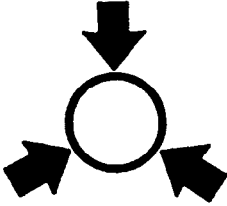
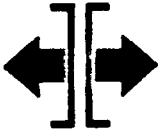
No.	Designation	Symbol	Remarks
3.1.4	Time—minutes*		
3.1.5	Time—hours*		
3.1.6	Increment*		
3.1.7	Diameter*		
3.1.8	High*		
3.1.9	Low*		
3.1.10	Weight		The measured quantity and units may be superimposed
3.1.11	Temperature*	  high temperature  low temperature	May be used to indicate:
3.1.12	Volts		
3.1.13	Amperes		
3.1.14	Watts		
3.1.15	Hertz, cycles per second		

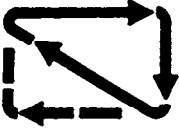
*Not included in ISO Recommendation.

SECTION 4 ACTIONS

Action symbols designate those controls which cause a direct response from the machine. They are different from symbols which are selection and presetting symbols: action symbols on the other hand may immediately cause a change in machine operation.

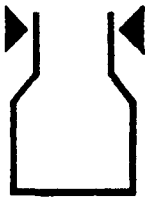
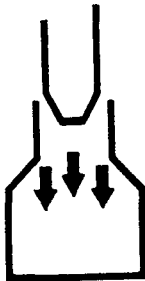
4.1 ACTION

No.	Designation	Symbol	Remarks
4.1.1	Increase of value		For example, speed or depth of cut
4.1.2	Decrease of value		
4.1.3	Stepless regulation		
4.1.4	Adjustable		Can be superimposed on associated symbols
4.1.5	Lock or tighten		For example, close chuck
4.1.6			
4.1.7	Unlock or untighten		For example, open chuck
4.1.8			
4.1.9	Brake on		

No.	Designation	Symbol	Remarks
4.1.10	Brake off		
4.1.11	Stop/off*		Ring-shaped symbol in red The vertical bar is green 'T' is green
4.1.12	Start/on*		
4.1.13	Start and stop with same control*		
4.1.14	In action as long as control operated*		
4.1.15	Emergency stop*		Large convex button entirely red
4.1.16	Engage		
4.1.17	Disengage		
4.1.18	Emergency return of automatic cycle to start†		
4.1.19	In†		This is used primarily in connection with the presentation of tools to the work-piece
4.1.20	Out†		

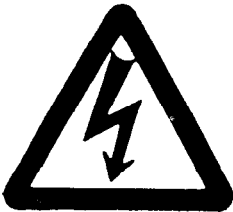
*These symbols may be on or adjacent to the control.

†Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
4.1.21	Trim moulded form		
4.1.22	Air eject moulded form		
4.1.23	Weigh workpiece		

SECTION 5 SAFETY AND STATUS INDICATIONS

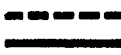
5.1 WARNINGS

No.	Designation	Symbol	Remarks
5.1.1	Caution — electrical danger		The electrical flash is red The background is yellow The triangle is black. If it is desired also to indicate the voltage, this should be done below the symbol, for example, 500 V
5.1.2	Caution — general warning		The caution sign is black The background is yellow The triangle is black

No.	Designation	Symbol	Remarks
5.1.3	Change speed in stopped position only*		ISO symbol 
5.1.4	Change speed in motion only		

*This differs from the ISO symbol as the ISO symbol is considered ambiguous and could be interpreted as 'do not rotate'.

5.2 STATUS INDICATIONS

No.	Designation	Symbol	Remarks
5.2.1	Malfunction		
5.2.3	Earth		
5.2.4	a.c. supply*		For example, 3-phase alternating current at 50 Hz 3 ~ 50 Hz
5.2.5	d.c. supply		

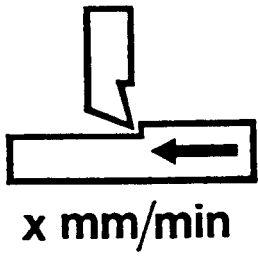
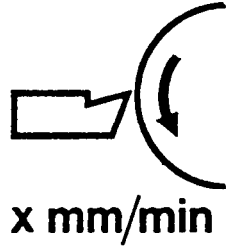
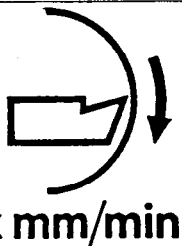
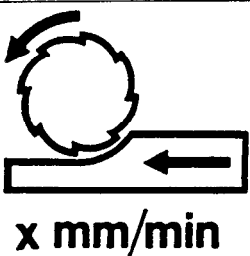
SECTION 6 COMPOUND SYMBOLS

6.1 MECHANICAL SYMBOLS

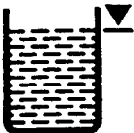
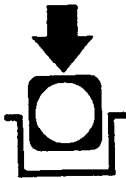
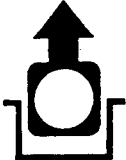
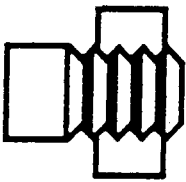
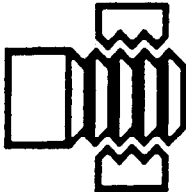
No.	Designation	Symbol	Remarks
6.1.1	Direction of spindle rotation		

No.	Designation	Symbol	Remarks
6.1.2	Number of revolutions per minute (spindle speed)	$x \circlearrowleft / \text{min}$	x being the number of revolutions to appear either before the symbol or in the corresponding numerical table
6.1.3	Feed per revolution	 $x \text{mm} / \circlearrowleft$	x being the value of the feed to appear either before the symbol or in the corresponding numerical table
6.1.4	Feed per minute	 $x \text{mm} / \text{min}$	x being the value of the feed to appear either before the symbol or in the corresponding numerical table
6.1.5	(Normal) feed	$\frac{1}{1}$ 	$1/x$ being the value of the ratio of the reduced feed to the normal feed (the symbol should be drawn with a finer pitch if it is intended to show more clearly the distinction from the normal feed)
6.1.6	Reduced feed	$\frac{1}{x}$ 	
6.1.7	Rapid feed	$\frac{x}{1}$ 	
6.1.8	Longitudinal feed		One arrow may be deleted if the feed is only in one direction
6.1.9	Transverse feed		

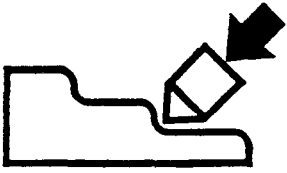
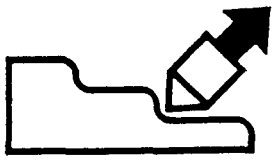
(Continued)

No.	Designation	Symbol	Remarks
6.1.10	Vertical feed		One arrow may be deleted if the feed is only in one direction
6.1.11	Speed of planing cut		x being the value of the speed in millimetres per minute to be shown either before the symbol or in the corresponding numerical table
6.1.12	Speed of turning cut		x being the value of the speed in millimetres per minute to be shown either before the symbol or in the corresponding numerical table
6.1.13	Speed of boring cut*		
6.1.14	Peripheral speed of drill		
6.1.15	Peripheral speed of milling cutter		

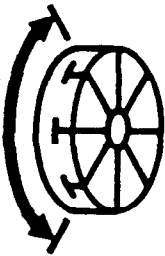
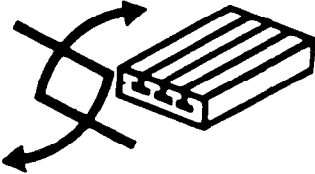
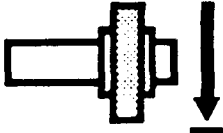
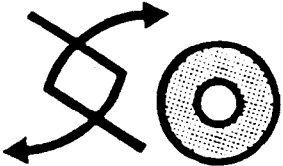
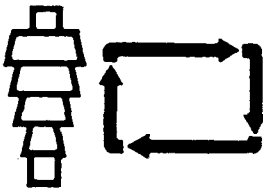
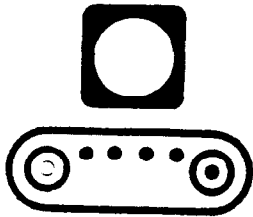
*Not included in ISO Recommendation.

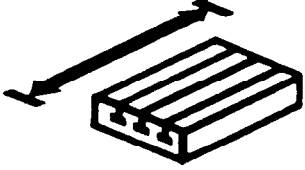
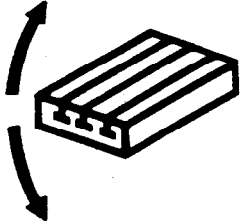
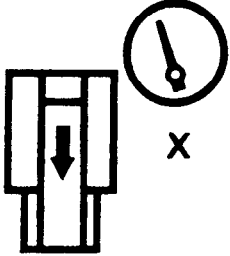
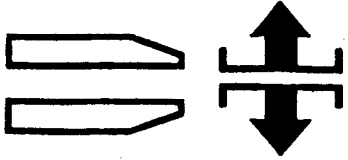
No.	Designation	Symbol	Remarks
6.1.16	Coolant pump		
6.1.17	Lubricant pump		
6.1.18	Hydraulic system pump		
6.1.19	Full level		
6.1.20	Low level		
6.1.21	Load work*		
6.1.22	Unload work*		
6.1.23	Close halfnut		Threads may be inclined to show either R.H. or L.H. thread
6.1.24	Open halfnut		

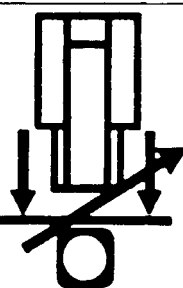
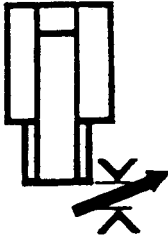
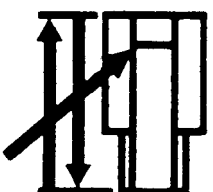
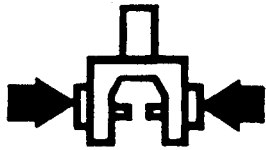
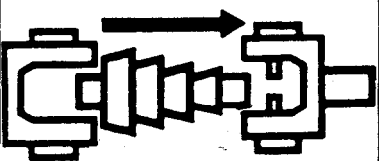
*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
6.1.25	Engage tracer		
6.1.26	Disengage tracer		
6.1.27	Cutter hold*		
6.1.28	Cutter release*		
6.1.29	Broach cutting stroke		
6.1.30	Broach return stroke		

*Not included in ISO Recommendation.

No.	Designation	Symbol	Remarks
6.1.31	Indexing of circular table		
6.1.32	Interchange table		
6.1.33	Wheel positioning		
6.1.34	Interchange grinding wheels		
6.1.35	Broaching; workpiece feeding		
6.1.36	Automatic broaching		
6.1.37	Workpiece conveyor		

No.	Designation	Symbol	Remarks
6.1.38	Shuttle table		
6.1.39	Tilting table		Arrows may be entered to suit specific function requirement
6.1.40	Slide load force (presses)		x = units of force
6.1.41	Shut height (refer to press)		
6.1.42	Blade clearance		
6.1.43	Broach force		x = units of force
6.1.44	Close gripper		

No.	Designation	Symbol	Remarks
6.1.45	Blade tensioning or adjusting		
6.1.46	Pressure cushion compressed (for presses)		
6.1.47	Pressure cushion gripping (for presses)		
6.1.48	Ejector bar adjustment		
6.1.49	Slide adjustment		
6.1.50	Stroke adjustment		
6.1.51	Close or lock puller head (broaching machine)		
6.1.52	Open or unlock retriever (broaching machine)		
6.1.53	Load broach into puller		

ANNEX A
(Clause 0.1)

EXAMPLES OF THE GROUPING OF SYMBOLS

So long as the basic symbols remain unchanged there will be many technical and economic advantages in the use of groups, but departure from the basic form in any instance will obviously result in difficulties. Figure 1 to 7 give examples of possible groupings of symbols.

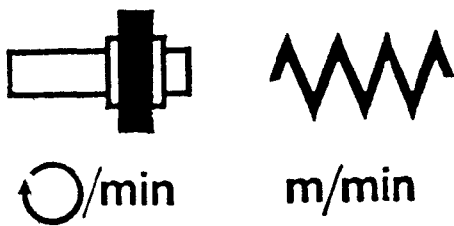


FIG. 1 GRINDING SPINDLE, REVOLUTIONS PER MINUTE AND FEED PER MINUTE

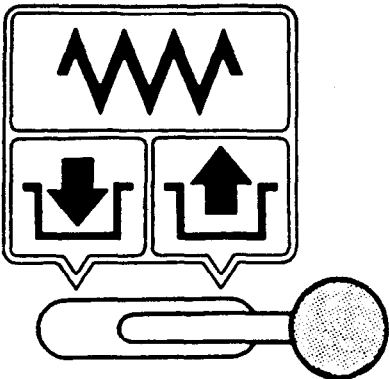


FIG. 2 PLATE ADJACENT TO A LEVER SHOWING THE FEED IN EITHER DIRECTION

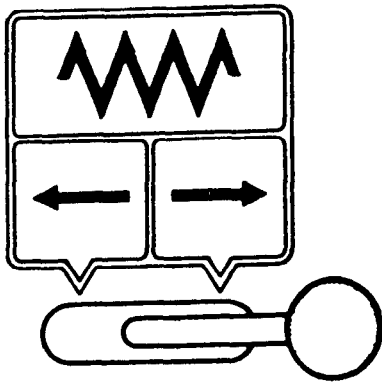


FIG. 3 ENGAGING FEED AND DISENGAGING FEED

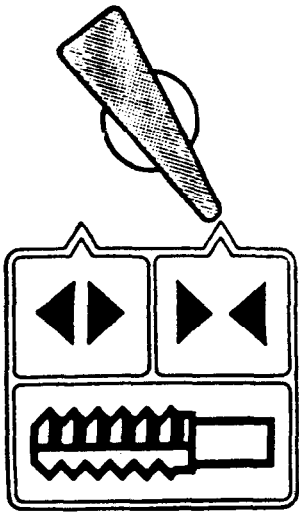


FIG. 4 PRESENTATION AND WITHDRAWAL OF TAPPING SPINDLE WITH RESPECT TO WORKPIECE

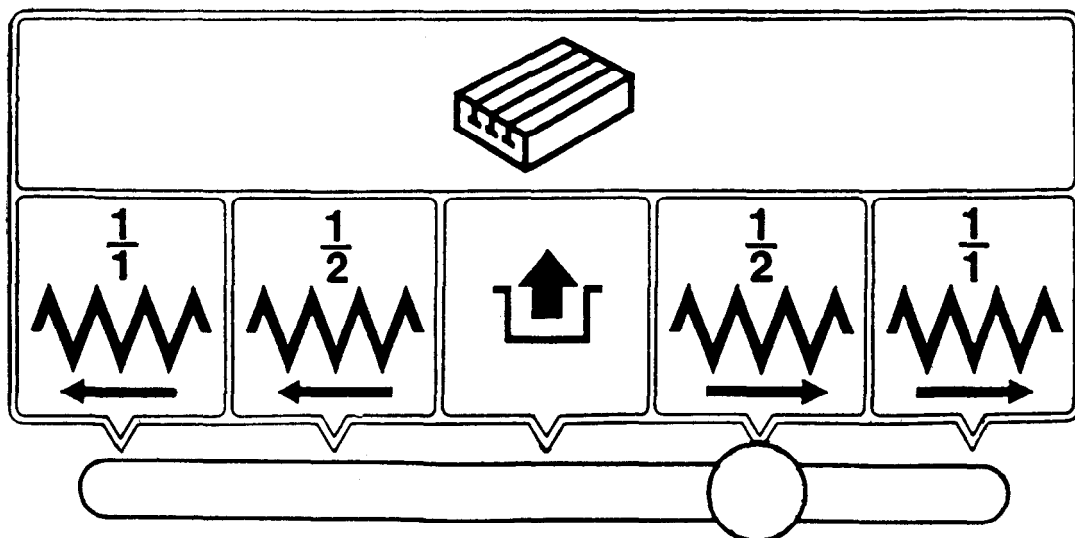


FIG. 5 LEVER CONTROLLING TABLE TRAVERSE WITH DISENGAGING POINT AND WITH VARYING FEED POSITIONS IN EACH DIRECTION LONGITUDINALLY

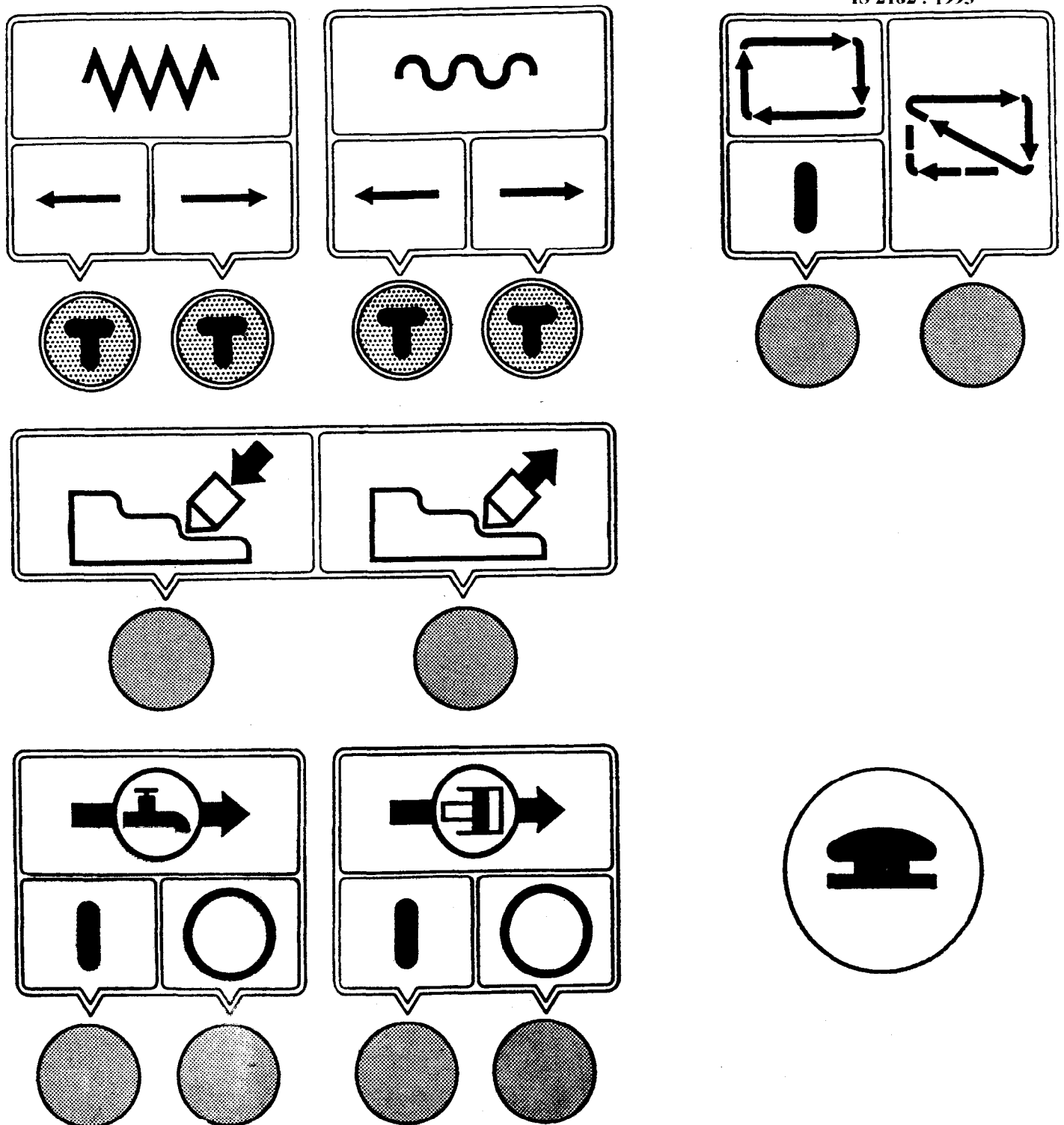


FIG. 6 APPLICATION OF SYMBOLS TO PLATE SHOWING A WIDE RANGE OF FUNCTIONS

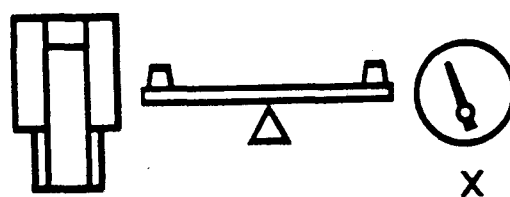


FIG. 7 BALANCED SLIDE PRESSURE (PRESSES)

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